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Claims

[c1] 1. A gearbox (1) for a motor vehicle and configured to be connected to an output side of a basic gearbox, said gearbox (1) comprising:
an input shaft (2) from the basic gearbox, an output shaft (3) to a transmission, and a planetary gear (4) arranged between the input shaft (2) and the output shaft (3);
the ring gear (18) of the planetary gear (4) is axially displaced by a first means (27) for instituting axial displacement of the ring gear (18);
a first coupling ring (10) for engaging a high-range mode and a second coupling ring (16) for engaging a low-range mode, the ring gear (18) being alternatively engageable with the coupling rings (10, 16);
at least one synchronizing means (15) with at least one friction surface (14, 22), the synchronizing means (15) being configured to synchronize rotational speed difference between the ring gear (18) and one of the coupling rings (10, 16) by interaction with a corresponding friction surface (13, 23) arranged on the respective coupling ring (10, 16);
the synchronizing means (15) and the second coupling

ring (16) being arranged coaxially outside the ring gear (18);

at least one second means (25) for engaging at least the second coupling ring (16) and a third means (25, 25b) for driving said synchronizing means (15) are arranged on a radially external side of the ring gear (18) and the second coupling ring (16) is arranged between the synchronizing means (15) and the first means (27).

[c2] 2. The gearbox as recited in claim 1, wherein the second means (25) is further engageable with the first coupling ring (10).

[c3] 3. The gearbox as recited in claim 1, wherein at least one internal bar is arranged on the radially internal side of the ring gear (18) and corresponding coupling teeth on the first coupling ring (10) are arranged on the radially external side of the first coupling ring (10).

[c4] 4. The gearbox as recited in claim 3, wherein said internal bars in the ring gear (18) constitute at least a portion of internal teeth (19) of the ring gear (18) that interact with planet wheels (7) forming part of the planetary gear (4).

[c5] 5. The gearbox as recited in claim 1, wherein the second means (25) and the third means (25, 25b) constitute a

combined fourth means (25, 25b) for driving said synchronizing means (15) and for engaging at least one of the coupling rings (10, 16).

[c6] 6. The gearbox as recited in claim 5, wherein bars (25, 25b) constitute at least one of: the second means (25), the third means (25, 25b) and the fourth means (25, 25b).

[c7] 7. The gearbox as recited in claim 1, wherein at least one synchronizing ring (15) constitutes the synchronizing means (15).

[c8] 8. The gearbox as recited in claim 7, wherein the synchronizing rings (15) are assembled into a double synchronizing ring (15) engageable with the two coupling rings (10, 16).

[c9] 9. The gearbox as recited in claim 1, wherein the ring gear (18) comprises, on a radially external side thereof, at least one first circumferential groove (20).

[c10] 10. The gearbox as recited in claim 1, wherein the synchronizing means (15) comprises, on a radially external side thereof, at least one second circumferential groove (30).

[c11] 11. The gearbox as recited in claim 10, wherein an es-

sentially annular, radially resilient element (21) is arranged in at least one of the first (20) and second (30) grooves, the radially resilient element (21) being moveable into and out of the particular groove (20, 30) when the ring gear (18) is axially displaced relative to the synchronizing means (15).

[c12] 12. The gearbox as recited in claim 11, wherein the radially resilient element (21) is an annular spring (21) having an interruption in a circumferential direction thereof.

[c13] 13. The gearbox as recited in claim 1, wherein blocking surfaces (28, 29) are arranged on the synchronizing means (15) and are capable of blocking engagement of said coupling rings (10, 16) and the ring gear (18) before synchronous rotational speed is achieved.

[c14] 14. The gearbox as recited in claim 1, wherein the internal teeth (19) of the ring gear (18) are angled in the tangential plane in relation to the axial centerline (32) of the ring gear (18) thereby enabling a servo effect when axial movement of the ring gear (18) takes place, and said angling shows counterclockwise displacement with increasing distance from one shaft end of the gearwheel (18).

[c15] 15. The gearbox as recited in claim 14, wherein said

bars (25) arranged on the external side of the ring gear (18) and the coupling teeth (31) arranged on the coupling ring (16) are angled in the tangential plane in relation to the axial centerline (32) of the ring gear (18) thereby balancing axial forces acting on the ring gear when the internal teeth of the ring gear are angled.